

## Policy Brief: Developing Safer Alternatives to Conventional Plastics and Supporting the Use of Reusable Products Can Reduce Harm to Health and the Environment

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**Study Background:** Researchers at ASU have identified opportunities to reduce risk to human health and the environment by changing the composition and disposal practices of polymers. Although plastics have benefited society in innumerable ways, the resulting omnipresence of plastics in society has led to concerns about the hazards of constant, low-level exposure and the search for options for sustainable disposal.

The team used examples from public health and medicine-sectors that have particularly benefited from polymer applications, to highlight the benefits of using plastics in certain applications and to pinpoint opportunities for reducing risks from all plastics' uses. These include phasing out polymers that contain components associated with negative health effects, diminishing the need to dispose of large quantities of plastic through reduction and reuse, and promoting and developing less harmful alternatives to conventional plastics.

**Overview of the Issue:** Human and animal studies have linked exposure to plastics constituents such as bisphenol A (BPA) and di-(2-ethyl-hexyl)phthalate (DEHP) with changes to the reproductive system, insulin resistance, behavioral effects and others. Evidence of potential harm from BPA in particular has been deemed sufficient for the FDA to ban it from use in bottles and spill-proof cups for infants and toddlers to reduce potential risk to particularly susceptible populations. Detectable levels of BPA have been found in the urine of 95% of the adult US population, and the fact that exposure to various plastic constituents does not occur in isolation, but jointly, is also an issue that requires further study and consideration.

As over 300 million tons of plastic are produced annually worldwide and ~50% is for disposable applications, it is necessary to consider how to either reduce this quantity or provide for sustainable disposal. Plastic disposal represents a complex problem, as the available disposal methods – including landfilling, recycling, incineration, and composting, depending on plastic type –each have disadvantages. Although composting represents the most environmentally-friendly solution, only a small fraction of currently produced plastics can be composted, and these typically require conditions only found in commercial composting facilities.

### Critical Opportunities for Decision Makers

- Invest in and promote research into developing safe, biodegradable plastics  
Example: A method discovered to produce a replacement to the BPA-containing epoxy resins of can linings could significantly reduce human exposure to BPA and sequester 180 million metric tons of carbon dioxide emissions, equal to taking over 37 million cars off the road annually. Replacements should represent true innovation, not a mere substitution of the problematic constituent with a closely related chemical (e.g., substitution of BPA with fluorinated BPA).
- Encourage the use of reusable products  
Example: Hospitals that have switched to reusable alternatives from disposable products have found a 50% reduction in medical equipment costs, as well as reduce their environmental impact.
- Support proper disposal of biodegradable plastics  
Biodegradable plastics often require conditions only met in commercial composting facilities to completely biodegrade. To increase the positive effect of using biodegradable plastics and reduce waste overall, curbside composting programs have been found to increase waste diversion from landfills from 40% to 55-69%.



For additional discussion please see the publication **Plastics and Environmental Health: the Road Ahead** available online at <http://dx.doi.org/10.1515/reveh-2012-0030>.

Document version 20130820. Research Project Report Series document ASU-SSEBE-CESEM-2013-RPR-002 available online at <http://repository.asu.edu/items/18325>.